查询IDT54FCT157ATD供应商

Integrated Device Technology, Inc.

FAST CMOS QUAD 2-INPUT MULTIPLEXER

IDT54/74FCT157T/AT/CT/DT
IDT54/74FCT257T/AT/CT/DT
IDT54/74FCT2257T/AT/CT

FEATURES:

- **Common features:**
  - Low input and output leakage ≤1μA (max.)
  - CMOS power levels
  - True TTL input and output compatibility
    - V_{OH} = 3.3V (typ.)
    - V_{OL} = 0.3V (typ.)
  - Meets or exceeds JEDEC standard 18 specifications
  - Product available in Radiation Tolerant and Radiation Enhanced versions
  - Military product compliant to MIL-STD-883, Class B and DESC listed (dual marked)
  - Available in DIP, SOIC, SSOP, QSOP, CERPACK and LCC packages
- **Features for FCT157T/257T:**
  - Std., A, C and D speed grades
  - High drive outputs (-15mA I_{OH}, 48mA I_{OL})
- **Features for FCT2257T:**
  - Std., A, and C speed grades
  - Resistor outputs (-15mA I_{OH}, 12mA I_{OL} Com.)
    (-12mA I_{OH}, 12mA I_{OL} Mil.)
  - Reduced system switching noise

DESCRIPTION:

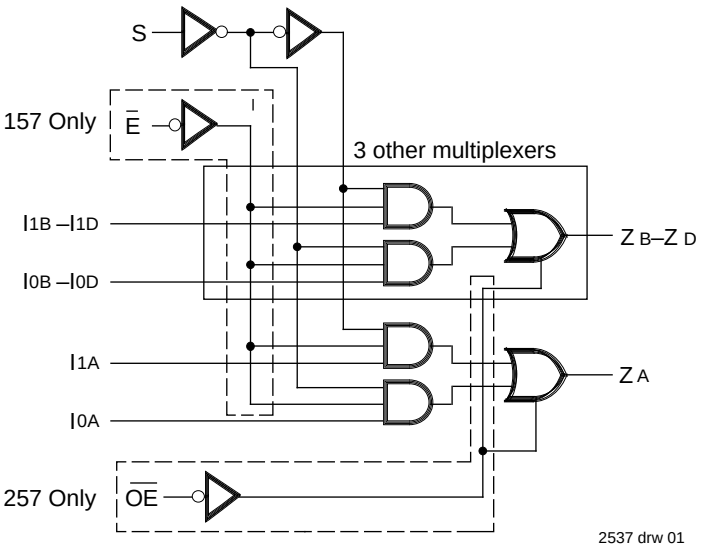
The FCT157T, FCT257T/FCT2257T are high-speed quad 2-input multiplexers built using an advanced dual metal CMOS technology. Four bits of data from two sources can be selected using the common select input. The four buffered outputs present the selected data in the true (non-inverting) form.

The FCT157T has a common, active-LOW, enable input. When the enable input is not active, all four outputs are held LOW. A common application of 'FCT157T is to move data from two different groups of registers to a common bus. Another application is as a function generator. The 'FCT157T can generate any four of the 16 different functions of two variables with one variable common.

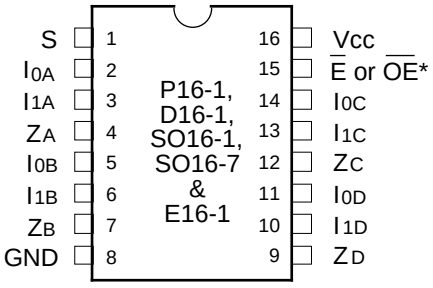
The FCT257T/FCT2257T have a common Output Enable ($\overline{OE}$) input. When $\overline{OE}$ is HIGH, all outputs are switched to a high-impedance state allowing the outputs to interface directly with bus-oriented systems.

The FCT2257T has balanced output drive with current limiting resistors. This offers low ground bounce, minimal undershoot and controlled output fall times-reducing the need for external series terminating resistors. FCT2xxxT parts are plug-in replacements for FCTxxxT parts.

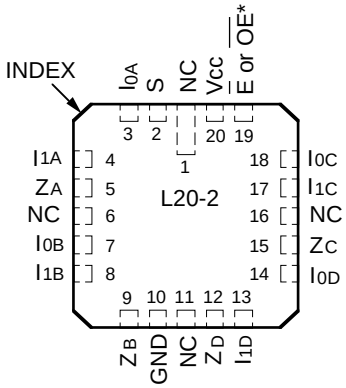
FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATIONS



DIP/SOIC/QSOP/CERPACK
TOP VIEW



LCC
TOP VIEW

* $\overline{E}$ for FCT157, $\overline{OE}$ for FCT257/FCT2257.

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PIN DESCRIPTION

Pin Names	Description
I_{0A}–I_{0D}	Source 0 Data Inputs
I_{1A}–I_{1D}	Source 1 Data Inputs
$\overline{E}$	Enable Input (Active LOW)–FCT157T
$\overline{OE}$	Output Enable (Active LOW)–FCT257T/2257T
S	Select Input
Z_A–Z_D	Outputs

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FUNCTION TABLE(1)

Inputs				Output Z_N	
$\overline{E}/\overline{OE}$	S	I_0	I_1	157	257
H	X	X	X	L	Z
L	H	X	L	L	L
L	H	X	H	H	H
L	L	L	X	L	L
L	L	H	X	H	H

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NOTE:
1. H = HIGH Voltage Level
   L = LOW Voltage Level
   X = Don't Care
   Z = High Impedance

ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Rating	Commercial	Military	Unit
V_{TERM}(2)	Terminal Voltage with Respect to GND	–0.5 to +7.0	–0.5 to +7.0	V
V_{TERM}(3)	Terminal Voltage with Respect to GND	–0.5 to V_{CC} +0.5	–0.5 to V_{CC} +0.5	V
T_A	Operating Temperature	0 to +70	–55 to +125	°C
T_{BIAS}	Temperature Under Bias	–55 to +125	–65 to +135	°C
T_{STG}	Storage Temperature	–55 to +125	–65 to +150	°C
P_T	Power Dissipation	0.5	0.5	W
I_{OUT}	DC Output Current	–60 to +120	–60 to +120	mA

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NOTES:
1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability. No terminal voltage may exceed V_{CC} by +0.5V unless otherwise noted.
2. Input and V_{CC} terminals only.
3. Outputs and I/O terminals only.

CAPACITANCE (T_A = +25°C, f = 1.0MHz)

Symbol	Parameter(1)	Conditions	Typ.	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	6	10	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	12	pF

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NOTE:
1. This parameter is measured at characterization but not tested.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:
Commercial: T_A = 0°C to +70°C, V_{CC} = 5.0V ± 5%; Military: T_A = –55°C to +125°C, V_{CC} = 5.0V ± 10%

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
V_{IH}	Input HIGH Level	Guaranteed Logic HIGH Level		2.0	—	—	V
V_{IL}	Input LOW Level	Guaranteed Logic LOW Level		—	—	0.8	V
I_{IH}	Input HIGH Current[4]	V_{CC} = Max.	V_I = 2.7V	—	—	±1	µA
I_{IL}	Input LOW Current[4]		V_I = 0.5V	—	—	±1	
I_{OZH}	High Impedance Output Current	V_{CC} = Max.	V_O = 2.7V	—	—	±1	µA
I_{OZL}	(3-State Output pins)[4]		V_O = 0.5V	—	—	±1	
I_I	Input HIGH Current[4]	V_{CC} = Max., V_I = V_{CC} (Max.)		—	—	±1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		—	–0.7	–1.2	V
V_H	Input Hysteresis	—		—	200	—	mV
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max., V_{IN} = GND or V_{CC}		—	0.01	1	mA

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OUTPUT DRIVE CHARACTERISITICS FOR FCT157/257T

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
V_{OH}	Output HIGH Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OH} = –6mA MIL. I_{OH} = –8mA COM'L.	2.4	3.3	—	V
			I_{OH} = –12mA MIL. I_{OH} = –15mA COM'L.	2.0	3.0	—	V
V_{OL}	Output LOW Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OL} = 32mA MIL. I_{OL} = 48mA COM'L.	—	0.3	0.50	V
I_{OS}	Short Circuit Current	V_{CC} = Max., V_O = GND[3]		–60	–120	–225	mA
I_{OFF}	Input/Output Power Off Leakage[5]	V_{CC} = 0V, V_{IN} or $V_O \leq$ 4.5V		—	—	±1	µA

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OUTPUT DRIVE CHARACTERISTICS FOR FCT2257T

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
I_{ODL}	Output LOW Current	V_{CC} = 5V, V_{IN} = V_{IH} or V_{IL}, V_{OUT} = 1.5V[3]		16	48	—	mA
I_{ODH}	Output HIGH Current	V_{CC} = 5V, V_{IN} = V_{IH} or V_{IL}, V_{OUT} = 1.5V[3]		–16	–48	—	mA
V_{OH}	Output HIGH Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OH} = –12mA MIL. I_{OH} = –15mA COM'L.	2.4	3.3	—	V
V_{OL}	Output LOW Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OL} = 12mA	—	0.3	0.50	V

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NOTES:

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 5.0V, +25°C ambient.
3. Not more than one output should be shorted at one time. Duration of the short circuit test should not exceed one second.
4. The test limit for this parameter is ±5µA at T_A = –55°C.
5. This parameter is guaranteed but not tested.

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions[1]			Min.	Typ.[2]	Max.	Unit
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max. V_{IN} = 3.4[3]			—	0.5	2.0	mA
I_{CCD}	Dynamic Power Supply Current[4]	V_{CC} = Max. Outputs Open $\overline{E}$ or $\overline{OE}$ = GND	V_{IN} = V_{CC} V_{IN} = GND	FCTxxxT	—	0.15	0.25	mA/ MHz
		One Bit Toggling 50% Duty Cycle		FCT2xxxT	—	0.06	0.12	
I_C	Total Power Supply Current[6]	V_{CC} = Max.	V_{IN} = V_{CC}	FCTxxxT	—	1.5	3.5	mA
		Outputs Open f_O = 10MHz	V_{IN} = GND	FCT2xxxT	—	0.6	2.2	
		50% Duty Cycle $\overline{E}$ or $\overline{OE}$ = GND	V_{IN} = 3.4	FCTxxxT	—	1.8	4.5	
		One Bit Toggling	V_{IN} = GND	FCT2xxxT		0.9	3.2	
		V_{CC} = Max.	V_{IN} = V_{CC}	FCTxxxT	—	1.5	3.5[5]	
		Outputs Open f_O = 2.5MHz	V_{IN} = GND	FCT2xxxT		0.6	2.2[5]	
		50% Duty Cycle $\overline{E}$ or $\overline{OE}$ = GND	V_{IN} = 3.4	FCTxxxT		2.5	7.5[5]	
		Four Bits Toggling	V_{IN} = GND	FCT2xxxT		1.6	6.2[5]	

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NOTES:
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
5. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_O N_O)$
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Output Transition Pair (HLH or LHL)
   f_O = Output Frequency
   N_O = Number of Outputs at f_O
   All currents are in milliamps and all frequencies are in megahertz.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE - FCT157T

			FCT157T				FCT157AT				
			Com'l.		Mil.		Com'l.		Mil.		
Symbol	Parameter	Condition[1]	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay I_N to Z_N	C_L = 50pF R_L = 500Ω	1.5	6.0	1.5	7.0	1.5	5.0	1.5	5.8	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to Z_N		1.5	10.5	1.5	12.0	1.5	6.0	1.5	7.4	ns
t_{PLH} t_{PHL}	Propagation Delay S to Z_N		1.5	10.5	1.5	12.0	1.5	7.0	1.5	8.1	ns

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			FCT157CT				FCT157DT				
			Com'l.		Mil.		Com'l.		Mil.		
Symbol	Parameter	Condition[1]	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay I_N to Z_N	C_L = 50pF R_L = 500Ω	1.5	4.3	1.5	5.0	1.5	3.9	—	—	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to Z_N		1.5	4.8	1.5	5.9	1.5	4.4	—	—	ns
t_{PLH} t_{PHL}	Propagation Delay S to Z_N		1.5	5.2	1.5	6.0	1.5	4.6	—	—	ns

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SWITCHING CHARACTERISTICS OVER OPERATING RANGE – FCT257/2257T

			FCT257/2257T				FCT257/2257AT				
			Com'l.		Mil.		Com'l.		Mil.		
Symbol	Parameter	Condition[1]	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay I_N to Z_N	C_L = 50pF R_L = 500Ω	1.5	6.0	1.5	7.0	1.5	5.0	1.5	5.8	ns
t_{PLH} t_{PHL}	Propagation Delay S to Z_N		1.5	10.5	1.5	12.0	1.5	7.0	1.5	8.1	ns
t_{PZH} t_{PZL}	Output Enable Time		1.5	8.5	1.5	10.0	1.5	7.0	1.5	8.0	ns
t_{PHZ} t_{PLZ}	Output Disable Time		1.5	6.0	1.5	8.0	1.5	5.5	1.5	5.8	ns

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			FCT257/2257CT				FCT257DT				
			Com'l.		Mil.		Com'l.		Mil.		
Symbol	Parameter	Condition[1]	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay I_N to Z_N	C_L = 50pF R_L = 500Ω	1.5	4.3	1.5	5.0	1.5	3.9	—	—	ns
t_{PLH} t_{PHL}	Propagation Delay S to Z_N		1.5	5.2	1.5	6.0	1.5	4.4	—	—	ns
t_{PZH} t_{PZL}	Output Enable Time		1.5	6.0	1.5	6.8	1.5	4.4	—	—	ns
t_{PHZ} t_{PLZ}	Output Disable Time		1.5	5.0	1.5	5.3	1.5	4.4	—	—	ns

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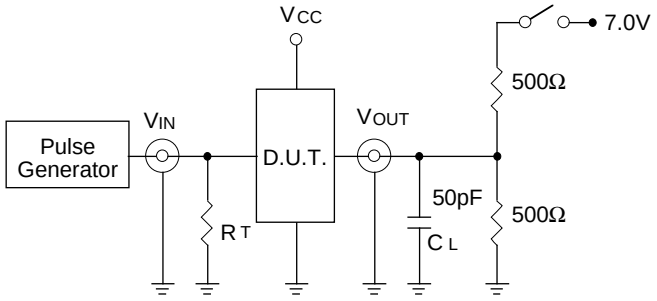
NOTES:
1. See test circuits and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delay.

TEST CIRCUITS AND WAVEFORMS

TEST CIRCUITS FOR ALL OUTPUTS



2537 drw 04

SWITCH POSITION

Test	Switch
Open Drain Disable Low Enable Low	Closed
All Other Tests	Open

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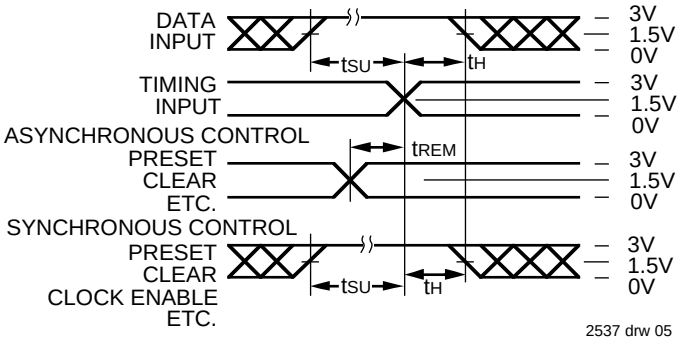
DEFINITIONS:

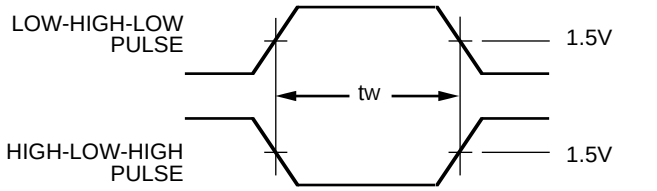
C_L= Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

SET-UP, HOLD AND RELEASE TIMES



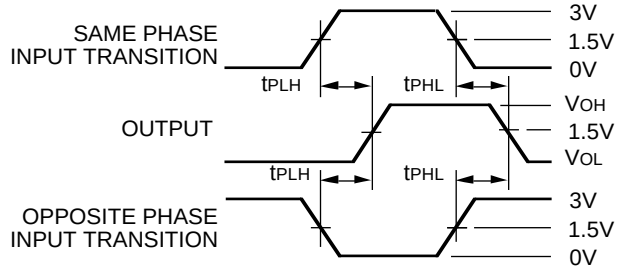
2537 drw 05

PULSE WIDTH



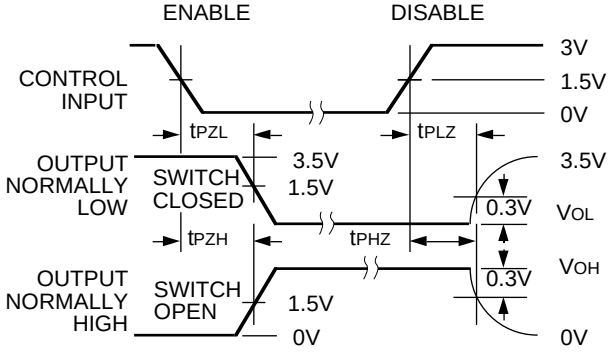
2537 drw 06

PROPAGATION DELAY



2537 drw 07

ENABLE AND DISABLE TIMES

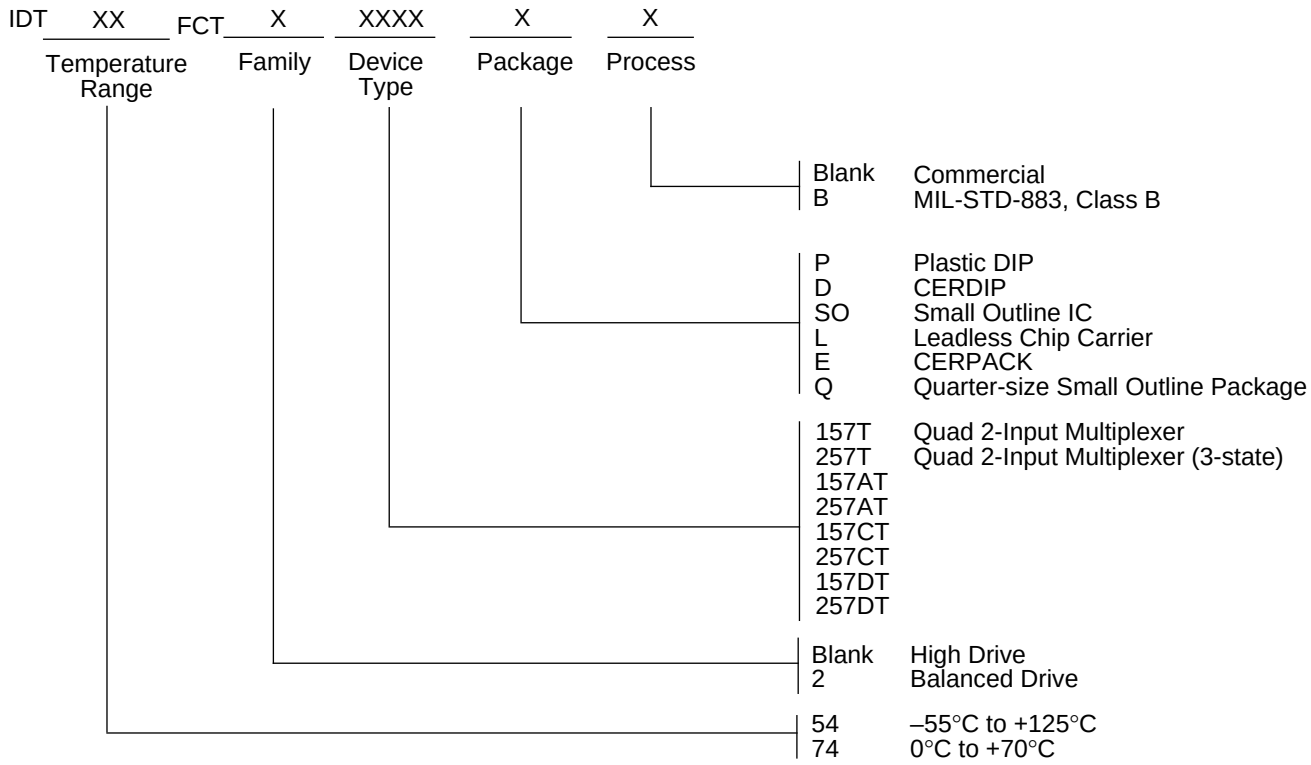


2537 drw 08

NOTES:

1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH
2. Pulse Generator for All Pulses: Rate ≤ 1.0MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns

ORDERING INFORMATION



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